



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

BRIAN VIALPANDO ET AL.

Serial No. 10/727,392 (TI-35829)

Filed December 4, 2003

For: A THIN FILM RESISTOR STRUCTURE AND METHOD  
OF FABRICATING A THIN FILM RESISTOR STRUCTURE

Art Unit 1765

Examiner Shamim Ahmed

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**CERTIFICATE OF MAILING OR TRANSMISSION UNDER 37 CFR 1.8**

I hereby certify that the attached document is being deposited with the United States Postal Service with sufficient postage for First Class Mail in an envelope addressed to Director of the United States Patent and Trademark Office, P.O. Box 1450,, Alexandria, VA 22313-1450 or is being facsimile transmitted on the date indicated below:

1-12-06

Jay M. Cantor, Reg. No. 19,906

**DECLARATION OF JAY M. CANTOR**


JAY M. CANTOR declares as follows:

1. THAT he is an attorney of record in the subject application.
2. THAT he has reviewed the attached invention disclosure.
3. THAT all redacted dates are prior to August 27, 2003.
4. THAT the subject invention was reduced to practice in the United States prior to August 27, 2003.

5. THAT the attached invention disclosure constitutes an invention "ready for patenting" in accordance with the Decision of the United States Supreme Court in Pfaff v. Wells Electronics, Inc., 525 U. S. 55 (U.S. 1998).

I declare under penalty of perjury that, on information and belief, the above stated facts are true and correct.

1-12-06  
Date

  
Jay M. Cantor  
Reg. No. 19906

**PATENT DISCLOSURE FORM**

DOCKET NO. TI-(to be filled in by Patent Activity)

**IF ELECTRONICALLY TRANSMITTED, PROCESSING OF YOUR  
DISCLOSURE CANNOT BE COMPLETED WITHOUT A  
FOLLOW-UP COPY SIGNED AND DATED BY ALL INVENTORS  
AND AT LEAST ONE WITNESS.**

1. Please suggest a descriptive title for your invention:

Method to improve contact to a thin film resistor layer by incorporation of a Ti glue layer.

2. This invention supports strategy: (check 1 or more)

- |                                     |                         |
|-------------------------------------|-------------------------|
| <input type="checkbox"/>            | DLP                     |
| <input type="checkbox"/>            | Materials               |
| <input checked="" type="checkbox"/> | Fab/Processes           |
| <input type="checkbox"/>            | Assembly/Test/Packaging |
| <input type="checkbox"/>            | Other                   |

- |                                     |                          |
|-------------------------------------|--------------------------|
| DSPS                                |                          |
| <input checked="" type="checkbox"/> | Wireless                 |
| <input checked="" type="checkbox"/> | Video                    |
| <input checked="" type="checkbox"/> | Set Top                  |
| <input checked="" type="checkbox"/> | Application Specific     |
| <input checked="" type="checkbox"/> | Remote/Access/Networking |
| <input checked="" type="checkbox"/> | Emerging Markets         |
| <input checked="" type="checkbox"/> | Mixed Signal & Logic     |
| <input checked="" type="checkbox"/> | Mass Storage             |
| <input checked="" type="checkbox"/> | Other                    |

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3. What is the problem solved by your invention?

Thin film resistors are very attractive components for high precision applications. In addition to low thermal coefficient of resistance, low voltage coefficient of resistance, good resistor matching performance, and trimability, they should provide good stability under thermal stress. To achieve good stability, it is critical to not only control the resistance of the body of the resistor, but also the interface of the interconnect material to the resistor. This invention provides electrically stable interface to SiCr thin film resistor layer in a sub-micron metallization process, and eliminates the particulate and maintenance issues associated with TiW processes.

4. What is your solution to the problem?

Replacing the TiW diffusion barrier/head material with Ti:TiN layer. This solution provide a lower particulate, lower resistive interface to the thin film resistor.

5. When was your solution first conceptually or mentally complete?

Date: \_\_\_\_\_

6. What is the first tangible evidence of such completion?

Date: \_\_\_\_\_

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7. What is different about your solution, compared with other solutions to the same problem?

At this time in the industry, TiW is the only interface material found for interface material to a thin film resistor (See attachment 2). Ti:TiN provides much lower particulate levels compared to TiW only processes. It is also compatible with current sub-micron metallization processes.

8. What are the advantages of your solution?

A Ti:TiN diffusion barrier/interface offers (i) Process compatible with sub-micron metallization (ii) excellent interface to SiCr resistor layer, (iii) good stability of the interface to thin film material (iv) repeatable interfaces and low interface resistance, (v) Lower particulate levels.

9. What TI products, processes, projects or operations currently implement your invention?

HPA07 technology testchips x1776 and x1816 currently implements our invention. There are plans to migrate it to HP-Bicom.

10. What is the date of the first implementation?

Date: 11/11/06

11. What record exists to prove this date?

SMS data showing POR

12. Is there any future implementation planned?

Yes ☒ No ☐

If so, please furnish the TI PART No. or project name

HPA07, HP-BiCom technologies

13. Has the invention been published or disclosed to anyone outside of TI?

Yes ☐ No ☒

When?

If planned - when? Patent disclosure (Catalog, advertising, data book, application note, conference paper, magazine article, TI TJ, proposal document.)

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Was there a nondisclosure agreement (NDA)?

Yes ☐ No ☒

14. Has a TI product incorporating the invention been publicly introduced, quoted, sampled or shipped?

Yes ☐ No ☒

When? If planned—when? Q2, . . .

15. Was the invention conceived or first implemented in the performance of a government contract or subcontract?

Yes ☐ No ☒

Contract #:

**THE INVENTION DESCRIBED BY THIS DISCLOSURE IS SUBMITTED  
PURSUANT TO MY EMPLOYMENT AGREEMENT WITH TEXAS INSTRUMENTS  
INCORPORATED OR A TI SUBSIDIARY (SPECIFY):**

Has this disclosure been previously sent to the Patent Department electronically (unsigned)?

Yes ☐ No ☒

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